paragraphs under the two species I show *maxima* named in 1775 and *fusiformis* in 1804.

I wish very cordially to thank Professor Cockerell for his kindness in calling these errors to my attention and giving me the opportunity to correct them.

Dr. Ellis L. Michael questions a statement in the same paper (page 139) in which I say: "The solitary individuals (of *Thalia democratica*) lie at a considerable depth during winter, spring and early summer, coming to the surface with the aggregated zooids in the fall." He writes that the records of the Scripps Institution show "the almost complete restriction of both generations to the months of June and July. I have gone through our list of deep water collections again, and find that the statement made in my (published) report to the effect that, when all depths are considered, the species is still almost entirely restricted to the months of June and July, stands as given."

My statement quoted above was somewhat inaccurate. *Salpa* (*Thalia*) *democratica* has been found at the surface every month in the year, but in North Atlantic waters it is most abundant at the surface from July to September. When not at the surface the animals must be in deeper water. A more accurate statement than the one quoted would be that both solitary and aggregated forms of *Salpa* (*Thalia*) *democratica* are less frequent at the surface during the colder months, becoming more abundant as summer advances, and being most abundant in the late summer and early fall. The conditions off the California coast seem a bit exceptional, the time of maximum frequency of this species at the surface of the ocean being about a month earlier than in North Atlantic waters, and the species being less frequent in the winter, spring and fall than in many regions. Dr. Michael's report of its abundance in June and July and its scarcity at other times, reminds one of Agassiz's reference to the sudden appearance of this species off the New England coast and its equally sudden disappearance.[3] In few, if any, other localities have so full records of distribution of pelagic organisms been made, as off La Jolla, and it may be that similar complete records for this species for other localities would show somewhat closer agreement with the records of the Scripps Institution.

[3] "Three Cruises of the *Blake*," *Bull. Mus. Comp. Zool. Howard Univ.*, Vol. 14, 1888, p. 190.

Maynard M. Metcalf

The Orchard Laboratory,
Oberlin, Ohio,
June 12, 1919

"WORKING UP" IN A SWING

A child sitting or standing in a swing can "work up" until he is swinging through a considerable distance. How is it possible for him, without touching his feet to the ground, to increase the extent of his swinging? As I do not recall ever seeing any discussion of this matter, the following note may not be out of place.

What the child does appears to be this: Near the end of an excursion he shifts his position so that he is on the whole farther from the axis of rotation [limb of tree, or other support], and when he is near the middle of his path he brings himself back again toward the axis. Now a shift of matter either away from the axis of rotation or toward it changes the moment of inertia about that axis, and therefore tends to change the angular velocity. In fact, unless a large torque is acting, a sudden shift must necessarily change the angular velocity. If the shift is made at a time when the angular velocity is small the change in angular velocity is small, but if the shift is made at a time when the angular velocity is large the change in the angular velocity may be considerable. Thus by moving toward the axis when near the middle of his path the child increases his velocity, whereas by moving away when near the end of the path he produces little change in his velocity.

This action may be imitated by a pendulum. Instead of keeping the length of the pendulum constant, the upper end of the suspending cord is passed over a hook and is held by a hand. The pendulum is set swinging with a small

amplitude. When near one end of the path the length of the pendulum is increased, and when near the middle of the path the length is decreased. In the course of a few swings the amplitude can be very greatly increased. The process can also be reversed and the motion of the pendulum very quickly damped.

The increase in the energy of the pendulum as its amplitude increases comes from the work done in lifting the bob when near the middle of its path. This is because a given change in the length of the pendulum involves a greater vertical displacement when the pendulum is nearly vertical than when it is much inclined to the vertical.

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A QUICK METHOD OF ELIMINATING SEED-BORNE ORGANISMS OF GRAIN

THE seed-borne diseases of grain have proved difficult to definitely eliminate from the seed. In connection with studies of hot formaldehyde as a fungicide for potato diseases it was tried for wheat scab. It was soon apparent that holding the grain in a formaldehyde solution at 50° C. as for potato scab was ineffective in killing the fungus or destructive to the viability of the seed. In order to overcome these difficulties the grain was suspended just above the formaldehyde solution one part in 240 parts of water and the temperature was raised to 98 to 99° C. and the time of exposure shortened to twenty seconds. Under these conditions all fungi in or on the seed were killed and in the majority of cases the bacteria were also eliminated. This momentary treatment did not injure the germinating capacity of the seed. The fungus flora of wheat seeds were destroyed in twenty seconds while the germinating capacity of the grain was not injured in forty seconds and only slightly at fifty. It is believed this method can be made practical for the control of scab and other seed borne diseases of grain.

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SCIENTIFIC BOOKS

The Grand Fleet, 1914–1916: Its Creation, Development and Work. By Admiral VISCOUNT JELLICOE of Scapa. New York, Geo. H. Doran Co. 1919.

One hardly expects a critical review of a book of this character except in military journals. Yet, this book is a plain, unvarnished narrative of the meeting in battle of the two great fleets of Great Britain and Germany. Jutland was the culmination of a struggle for supremacy on the seas and back of that for world domination. It was essentially a tryout of scientific methods of annihilation as developed and adopted by the two leading nations of the world. The book might well carry as a sub-title "Science in Naval Warfare up to 1916." And therefore brief comment upon the scientific methods of the opponents is not out of place here, for we all know *now* that professional military and naval men have to lean and lean heavily upon non-official scientific men.

The battle of Jutland as described in this book reminds one of a Homeric conflict, for just when some great captain had closed with his antagonist, the watching gods, disguised as mists, fogs and poor visibility intervened and separated the fighters. Much as we would like to compliment the British, the palm for preparation and scientific attainment must go to the Germans. The British had more ships and more guns; but the Germans had better range finders, better telescopic sights, better mine fields, better torpedoes, better submarines and more of them, better overhead observation facilities and a Zeppelin or two.

The Grand Fleet (British) appears to have made use of a single seaplane which flew very low, yet whose observations as Vice Admiral Beatty says, were "of distinct value."

The German battleships were of greater displacement than contemporary British ships and carried a greater weight of armor. Nine of the British dreadnaughts had protection to the main deck only, while all of the German dreadnaughts had side armor to the upper deck. The Germans had a delay action fuse